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Response Under 37 CFR
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Procedure-Examining Group
Art Unit 126

PATENT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Art Unit: 126
Examiner: J. Reamer
P.D. File No.: 30-2004 (4690)

Inventors: RICHARD R. HERTZOG ET AL.
Serial No.: 297,333
Filed: January 17, 1989
For: DECOMPOSITION OF CUMENE HYDROPEROXIDE

Petersburg, Virginia 23804
April 11, 1990

REQUEST FOR RECONSIDERATION AFTER FINAL REJECTION

Commissioner of Patents
Washington, DC 20231

Sir:

This is responsive to the final office action dated February 15, 1990. Reconsideration and withdrawal of the rejection is respectfully requested.

The examiner states that "Sifniades et al. teaches the use of acetone in Examples 1 to 5 and 13 to 17". He also states that "applicants have not presented side-by-side comparisons to show the criticality of the instant acetone concentration range".

The examples quoted by the examiner do not pertain to the process of decomposing a cumene oxidation product mixture per se taught by Sifniades et al.

Examples 1 to 5 describe the acid catalyzed decomposition of pure CHP. They serve to demonstrate that such decomposition produces increasingly larger amounts of undesired by-products as the temperature is increased. The context of these examples is clearly indicated in the discussion of Sifniades et al., p. 4, lines 52 to 56.

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Examples 13 to 17 describe the acid catalyzed decomposition of pure DCP. They serve to demonstrate that the best yields of AMS are obtained at temperatures over 100°C, e.g. 120°C to 150°. The context of these examples is indicated in the discussion of Sifniades, et al., p. 3, lines 1 to 3.

In both series of examples, the solvent consists essentially of equimolar phenol/acetone containing 15 wt% cumene, 1% water, and a catalytic amount (50 to 100 ppm) of sulfuric acid. This mixture is meant to simulate the solvent present during a typical continuous decomposition of cumene oxidation product in which the main products (i.e. equimolar phenol/acetone) along with cumene, added water and catalyst are the main components of the solvent.

Water and catalyst are the only components of the process for decomposition of cumene oxidation product as taught by Sifniades et al. that are added externally. All other components are either present in the original mixture (e.g. cumene) and/or produced during the reaction (e.g. phenol, acetone, part of water). There is no suggestion for addition of acetone in the process. Acetone is used only in examples that serve to illustrate the course of decomposition of specific species (such as CHP and DCP) and then only in essentially equimolar mixture with phenol and with cumene present to simulate a continuous reaction involving no added acetone.

Regarding the second of the examiner's objections, it is respectfully submitted that examples 1 to 12 of the instant application, when viewed according to the plots of Figure 2, provide a clear side-by-side comparison of the effect of recycling acetone.

There are two objectives in the operation of a commercial process for decomposition of cumene oxidation product that are addressed by the process of the instant application.

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- a) High yield of useful products. AMS is a useful product. Moreover, AMS yield as defined on page 11, lines 10 to 15 of the application, generally correlates with phenol yield.
- b) Process stability. The main threat to process stability is a runaway reaction resulting from uncontrolled decomposition of residual CHP as discussed on page 2 lines 36 to 38 and page 3, lines 1 to 11 of the application.

Consequently, it is desirable to operate the decomposition of cumene oxidation product in such a manner that the highest yield is obtained with the lowest amount of residual CHP present. It can be seen from Figure 2 that for a given yield of AMS a much lower concentration of residual CHP is necessary when acetone is recycled in the process than when it is not. Thus, to obtain 80% AMS yield it is necessary to have only ca 0.3 wt% residual CHP when 60% of acetone is recycled, whereas ca 1.7 wt% is required with no acetone recycle. Conversely, for a given level of residual CHP (which corresponds to an accepted level of reactor instability) a higher AMS yield is obtained when acetone is recycled to the process than when it is not. Thus, if residual CHP is set at ca 1 wt%, the AMS yield is ca 84% when 60% of acetone is recycled, whereas it is ca 76% when no acetone is recycled.

In view of the discussion above, it is respectfully submitted that the claimed process is not taught or suggested by the cited references, or alternatively that the increase in AMS yield provided by utilization of the second stage provides a showing of unexpected results. Accordingly, it is requested that the rejection be withdrawn and the claims passed to issue.

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DATE
April 11, 1990

DAYS

Respectfully submitted,
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